

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property  
Organization  
International Bureau



(43) International Publication Date  
3 March 2005 (03.03.2005)

PCT

(10) International Publication Number  
**WO 2005/019405 A1**

(51) International Patent Classification<sup>7</sup>: C11D 17/00

(21) International Application Number:  
PCT/US2003/029742

(22) International Filing Date:  
22 September 2003 (22.09.2003)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:  
60/495,214 13 August 2003 (13.08.2003) US

(71) Applicant (for all designated States except US): UNIVERSITY OF WYOMING [US/US]; Research Products Center Office, P.O. Box 3672, Laramie, WY 82071 (US).

(72) Inventor; and

(75) Inventor/Applicant (for US only): JAEGER, David, A. [US/US]; 1709 Palmer Drive, Laramie, WY 82070 (US).

(74) Agents: HAGAN, Patrick, J. et al.; Dann, Dorfman, Herrell and Skillman, 1601 Market Street, Suite 2400, Philadelphia, PA 19103 (US).

(81) Designated States (national): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(84) Designated States (regional): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Published:

— with international search report

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: SHAMROCK SURFACTANTS AND THEIR METHODS OF USE

(57) Abstract: Disclosed are surfactants that contain two ionic or polar nonionic head groups, each connected to a central ionic head group by a hydrocarbon linking moiety. The central head group is a dithiophosphate, dithiocarbamate, or quaternary ammonium group. These surfactants have potential applications in chemical decontamination of mustard (simulants), storage and release devices/chemical switches and the remediation of heavy-metal ion-contaminated water.

WO 2005/019405 A1

BEST AVAILABLE COPY